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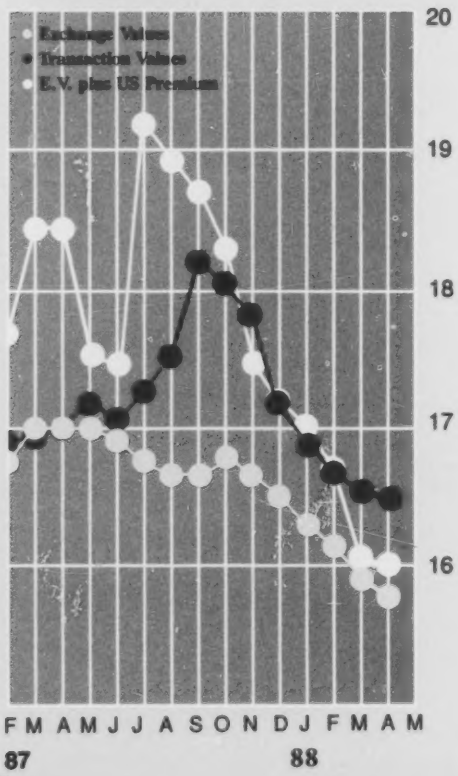

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MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

May 1988 No. 237

R. GENE CLARK, *EDITOR* FRANCE A. HEAD, *ASSISTANT EDITOR*

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To Our Readers

* * *

Nuexco International Corporation is pleased to announce that it has acquired the brokerage, trading, and publication operations of SWUCO, Inc. and its subsidiary, the SWUCO Inventory Storage Corporation ("SISCO"). SWUCO's and SISCO's trading and brokerage activities will be continued as subsidiaries of Nuexco Trading Corporation (NTC), and the publications activities, including the SWUCO Monthly Report, will be continued as a subsidiary of Nuexco Information Services (NIS).

Walt Wolf, SWUCO's President, is joining NUEXCO, devoting most of his efforts to serving NTC in uranium and enrichment brokerage and trading activities. He will also serve as President of newly-formed NUEXCO subsidiaries with the SWUCO and SISCO names, which will engage in other NUEXCO activities.

Walt has served the nuclear industry since 1958, beginning with the General Electric Company at the Hanford Works in 1958, and the GE Nuclear Energy Division in 1960. He joined Nuclear Fuel Services (NFS) in Rockville, Maryland as Sales Manager in 1972, and was appointed Vice President of SWUCO in April 1973, at the time of its founding.

Walt holds a B.S. degree in Mathematics from Northwestern University and an M.B.A. from the University of Santa Clara. He currently serves as Chairman of the Board of Governors of the World Nuclear Fuel Market and is an active member of the American Nuclear Society and the U.S. Council for Energy Awareness. These activities, together with his work at SWUCO, have made Walt Wolf well known and respected throughout the industry.

In addition to Walt, two SWUCO staff members, **R. Lee Clanton, Jr.** and **Anita E. Blumenthal**, are being integrated into NUEXCO in areas corresponding to their former SWUCO responsibilities, and they will continue to be based in the Washington, D.C. area.

Before joining SWUCO in 1983 as Director of Brokerage, **Lee** spent nine years as a nuclear engineer with Duke Power Company where he managed enrichment service contracts with the US Department of Energy and was involved in secondary market transactions of SWU and enriched uranium. A registered Professional Engineer, Lee holds a B.A. in Engineering from North Carolina State University. Lee will continue brokerage activities with NTC.

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Anita's background includes editing and production of monthly newsletters and annual publications in the legal, agricultural and computer fields. In March 1983, she joined SWUCO as Manager of Publications, responsible for the SWUCO report. Anita holds two degrees in English - a B.A. from Brandeis University and an M.A. from the New University of Ulster in Northern Ireland. Anita will work for NIS.

We are also pleased to announced the addition last month of two new members to NIS:

France A. Head will be succeeding Charles B. Lewis as Associate Editor of the Monthly Report. France has over six years of experience in the uranium industry, acquired during employment with Minatome Corporation. She holds a B.A. in French and an M.B.A., both from the University of Colorado.

David S. Schramm will be responsible for providing analytical support for market and consulting studies. David is a recent honors graduate of the Colorado School of Mines where he received a M.S. in Mineral Economics.

Charlie Lewis moved to California at the end of April to pursue other endeavors. We wish him continued success in the future.

* * *

The 1987 Annual Review will be mailed to our subscribers this month. This Special Report provides a summary of nuclear fuel activities in 1987 as well as analysis of pricing trends on the spot/near-term markets for uranium and secondary market enrichment services. The NUEXCO market values are also included in a series of tables for reference.

If you would like to purchase additional copies of the 1987 Annual Review, please contact Lori Costarella in our Denver office at (303) 893-4015.

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April 30, 1988	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE	**$15.75**/lb. U_3O_8	5,620[2]	2,515[2]
US Premium	**$0.25**		
UF_6 VALUE	**$45.25**/kg U as UF_6	5,620[2]	2,515[2]
US Premium	**$0.50**		
CONVERSION VALUE	**$1.80**/lb. U as UF_6	0	750
SWU VALUE			
0.3 tails assay:	**$68**/SWU	305	260
LOAN RATE	**3.5%**/annum	7,600	0

TRANSACTION VALUE

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
16.45	**3.3**	**25**	**5**

[1]Supply and demand tables in the *Current Market Data* section of this Report detail the numbers for each category.
[2]For either uranium concentrates or uranium hexafluoride.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **UF_6 Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.
3. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
4. The **SWU Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the date indicated.
5. The **Loan Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
6. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

The sample time is extended as necessary to include these minima. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.
7. The **US Premium** is Nuexco's judgment of the incremental price (relative to the Exchange Value or UF_6 Value, as applicable) at which transactions for significant quantities of natural uranium could be concluded as of the date indicated, if the buyer will accept only US-origin.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions.
   b. Data from pending transactions.
   c. Firm bids to buy or borrow, and firm offers to sell or lend.
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these Market Values.
3. In the determination of prices, Nuexco does not consider transportation charges other than those customarily provided by suppliers .
4. The prices of services or materials delivered under long-term contracts with primary suppliers are not considered in the determination of the listed values.
5. For the SWU Value, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight percent U_{235} and a product assay of 3.0 weight-percent U_{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

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NATURAL URANIUM AND SECONDARY MARKET CONVERSION

(All data as of April 30, 1988)

The **Exchange Value** is **$15.75** per pound U_3O_8, down $0.15 since last month. US-origin U_3O_8 is commanding a **premium** (relative to the Exchange Value) of **$0.25** per pound U_3O_8 (up $0.10).

Active supply of natural uranium (concentrates and UF_6) for spot term delivery totals **5,600,000** pounds U_3O_8 equivalent, down 400,000 pounds since last month. The corresponding figure for **active demand** is **1,200,000** pounds, down 1,300,000 pounds. The spot and near-term supply-demand ratio is 4.8, up from 2.4 at the end of March.

The *Current Market Data* section of this Report lists one natural uranium sale for less than 300,000 pounds U_3O_8 equivalent, which is included in the Transaction Value calculation.

The **Transaction Value** is **$16.45** per pound U_3O_8, down $0.10 since last month. The calculation extends over a 5-month period and includes 25 transactions involving 3.3 million pounds equivalent U_3O_8.

The **UF_6 Value** is **$45.25** per kilogram U in UF_6, down $0.25. The **premium** for US-origin UF_6 is **$0.50** per kilogram U (no change). No transactions involving UF_6 are reported.

The **Conversion Value** is **$1.80** per pound U as UF_6, unchanged since last month. There is no active supply of secondary market conversion services reported this month. Active demand totals 750,000 pounds U as UF_6. One secondary market conversion transaction is reported.

The **Loan Rate** is **3.5 percent** per annum, unchanged from last month. No loan transactions are reported.

* * *

The **Exchange Value** declined $0.15, to $15.75 per pound U_3O_8 this month. Activity in the U_3O_8 market was limited in April, and only one transaction is reported. Aggressive offering prices at or below this month's Exchange Value failed to stimulate significant buyer interest, except in the above mentioned case in which a European utility purchased less than 300,000 pounds of non-US-origin U_3O_8 in a transaction involving special payment terms and delivery conditions. Although supply remains substantial, spot market demand for concentrates was weaker than in the previous month, causing downward pressure on prices. Most of the existing demand came from three US utilities considering discretionary purchases; at the end of April, one other US utility was conducting negotiations involving a significant quantity of material, although that transaction had not been finalized.

The market for US-origin concentrates was sluggish in April, and no US-origin transactions are reported, even though most of the concentrate demand is for US-origin material. Supply of US-origin uranium does not appear to have significantly diminished. The Premium (relative to the Exchange Value) for US-origin U_3O_8 increased $0.10, to $0.25 per pound U_3O_8, creating a level of $16.00 for buyers specifying only US-origin U_3O_8. However, two recent external events have caused many US producers and potential US-origin buyers temporarily to withdraw from active participation in the US-origin market.

On March 30, 1988, the US Senate passed the Uranium Revitalization, Tailings Reclamation and Enrichment Act (S.2097), by a vote of 62 to 28, including in the bill a provision calling for certain restrictions on domestic usage of non-US-origin uranium. While the bill's eventual passage by the House of Representatives and its signature into law by President Reagan are uncertain, the Senate's passage of the bill did raise the hopes of some US producers that import restrictions might eventually be imposed in the USA. As a result, some producers withdrew offers and stepped back from aggressive competition.

On April 27, the US Supreme Court heard oral arguments in the US Producers vs. DOE lawsuit. The Court's questioning focused on the definition of viability, and not on the narrow legal issue of whether DOE had *discretion* in restricting enrichment of imported uranium when the domestic uranium industry had been declared to be non-viable. The Court asked for clarification of whether viability meant financial profitability, or the ability of the industry to supply 100 percent of domestic needs. Given the Justices' line of questioning, it is possible that the case could be sent back to the lower courts for further findings on the issue of industry viability. Thus, DOE's chances of having the earlier Appeals Court's decision overturned by the Supreme Court appeared to have improved. A decision is likely to be made before the Court recesses in June.

The Supreme Court hearing came too late in the month to influence the month's transactions, and in general, the two events' effects on perceptions of the US-origin market in the longer term remain to be seen, although they suggest

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almost opposite scenarios. This could provide a continuation of the market's recent relative inactivity. If the small price difference between US and non-US origins continues, many US utilities may find little reason to purchase non-US-origin material until the origin issue is clarified.

The **UF6 Value** declined $0.25, to $45.25 per kg U as UF6 during April. For the second month, the UF6 market was inactive, and no transactions are reported. Active supply of natural UF6 continues to be relatively weak, compared to the level of U3O8 supply, and little US-origin UF6 is available. Persistently weak demand, combined with the increased competition among sellers of both natural and enriched UF6 for the few opportunities that do appear, continue to place downward pressure on prices. At the end of April, one US utility asked for another round of bids for a significant quantity of enriched material, and another was negotiating to purchase natural UF6. In addition, a European utility continued to evaluate offers for natural UF6.

The Premium (relative to the UF6 Value) for US-origin was unchanged from last month, at $0.50 per Kg U as UF6, as the limited natural UF6 supply was not actively marketed.

* * *

The **Loan Rate** remains unchanged this month, at 3.5 percent per annum. Loan supply remains large, but no firm demand exists at the present time. The absence of firm demand continues to thwart potential lenders' efforts to find borrowers. No loan transactions are reported this month.

* * *

The **Conversion Value** is unchanged at $1.80 per pound U as UF6. One US utility reportedly is negotiating to dispose of its excess conversion, and at least two other utilities are expected to enter the market for conversion services within the next several months. At present, however, the conversion market remains thin. No secondary market conversion transactions are reported this month.

ENRICHED URANIUM AND SWU

The **SWU Value** is $68 per SWU, down $2 since last month. Increased interest by potential SWU buyers was offset by a number of SWU sellers offering enrichment services below the $70 level, causing downward price pressure. Primary suppliers continue to participate in the secondary market, directly or indirectly, effectively increasing the available supply. As of the end of April, a US utility had solicited a second round of bids for a significant quantity of SWU contained in enriched product, and another was evaluating offers. One SWU transaction is reported this month involving less than 50,000 SWU in a transaction involving extended delivery and payment late next year.

As in the past, fluctuations in the SWU value reflect firming or softening within a general price range, and varies depending on the terms of a particular transaction. Payment terms, SWU origin, delivery location, and flexibility of enrichment assay all affect the prices offered by SWU sellers. In a thin market, the appearance of one or more large, firm buyers can cause competition among sellers to increase, and consequently drive the price down quickly.

Of late, the non-western-origin SWU suppliers have quoted the lower prices because western buyers associate a certain degree of risk with new supply sources. SWU prices in the middle of the range generally reflect sellers of excess DOE-origin SWU commitments or sellers of enriched uranium inventory with location or assay constraints. At the high end of the price spectrum are sellers of excess Eurodif or Urenco SWU commitments. Although these sellers offer the most flexibility in delivery location and product assay, the weakness of the US dollar in relation to European currencies has caused offering prices for those SWU to rise in terms of US dollars.

While the recent terminations of DOE SWU commitments in the 1996-98 period by a number of utilities worldwide could indicate an increase in secondary and spot market SWU activity, such expectations might be premature. Most utilities, particularly the larger ones, viewed cancellations in the April 1, 1988 notices as merely preserving options for enrichment in the marketplace, rather than as an abandonment of DOE supply. NUEXCO expects that several of these utilities will ultimately purchase some combination of DOE, Eurodif or Urenco supply for the bulk of their requirements after 1995. Thus, secondary market SWU activity could increase in the mid-1990s, but the response to the April 1 notice is not an accurate indicator.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Apr 30, 1988)	Last Month (Mar 31, 1988)	12 Months Ago (Apr 30, 1987)	This Month (Apr 30, 1988)	Last Month (Mar 31, 1988)	12 Months Ago (Apr 30, 1987)
Australia (dollar)	20.76	21.51	26.15	53.98	55.91	67.97
Belgium (comm. franc)	550.12	555.56	631.50	1,430	1,444	1,642
Canada (dollar)	19.37	19.64	22.73	50.36	51.07	59.09
EEC (ecu)	12.68	12.80	14.72	32.97	33.27	38.26
Finland (markka)	62.82	63.83	74.46	163.33	165.94	193.59
France (franc)	89.29	89.53	101.49	232.12	232.75	263.86
FRG (mark)	26.29	26.40	30.45	68.34	68.64	79.16
Italy (lira)	19,529	19,557	21,778	50,771	50,844	56,618
Japan (yen)	1,961	1,984	2,366	5,098	5,157	6,152
Netherlands (guilder)	29.48	29.66	34.39	76.64	77.12	89.41
South Africa (rand)	33.83	33.82	34.03	87.96	87.93	88.48
Spain (peseta)	1,737	1,770	2,140	4,516	4,603	5,563
Sweden (krona)	92.27	93.92	106.65	239.87	244.16	277.27
Switzerland (franc)	21.79	21.79	24.96	56.65	56.65	64.88
UK (pound)	8.40	8.45	10.24	21.84	21.97	26.62
US (dollar)	15.75	15.90	17.00	40.95	41.34	44.20

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Apr 30, 1988)	Last Month (Mar 31, 1988)	12 Months Ago (Apr 30, 1987)	This Month (Apr 30, 1988)	Last Month (Mar 31, 1988)	12 Months Ago (Apr 30, 1987)
Australia (dollar)	21.69	22.39	26.15	56.38	58.20	67.97
Belgium (comm. franc)	574.57	578.27	631.50	1,494	1,503	1,642
Canada (dollar)	20.23	20.45	22.73	52.60	53.16	59.09
EEC (ecu)	13.25	13.32	14.72	34.44	34.63	38.26
Finland (markka)	65.62	66.44	74.46	170.59	172.73	193.59
France (franc)	93.25	93.19	101.49	242.44	242.27	263.86
FRG (mark)	27.45	27.48	30.45	71.37	71.45	79.16
Italy (lira)	20,397	20,357	21,778	53,027	52,923	56,618
Japan (yen)	2,048	2,065	2,366	5,324	5,368	6,152
Netherlands (guilder)	30.79	30.88	34.39	80.04	80.27	89.41
South Africa (rand)	35.34	35.21	34.03	91.87	91.53	88.48
Spain (peseta)	1,814	1,843	2,140	4,717	4,791	5,563
Sweden (krona)	96.37	97.76	106.65	250.53	254.14	277.27
Switzerland (franc)	22.76	22.68	24.96	59.17	58.96	64.88
UK (pound)	8.77	8.80	10.24	22.18	22.87	26.62
US (dollar)	16.45	16.55	17.00	42.77	43.03	44.20

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on the last working day of the month.

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CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb U as UF_6			per kg U as UF_6		
	This Month (Apr 30, 1988)	Last Month (Mar 31, 1988)	12 Months Ago (Apr 30, 1987)	This Month (Apr 30, 1988)	Last Month (Mar 31, 1988)	12 Months Ago (Apr 30, 1987)
Australia (dollar)	2.37	2.43	2.77	5.23	5.37	6.10
Belgium (comm. franc)	62.87	62.89	66.86	138.61	138.66	147.41
Canada (dollar)	2.21	2.22	2.41	4.88	4.90	5.31
EEC (ecu)	1.45	1.45	1.56	3.20	3.19	3.44
Finland (markka)	7.18	7.23	7.88	15.83	15.93	17.38
France (franc)	10.20	10.14	10.75	22.50	22.34	23.69
FRG (mark)	3.00	2.99	3.22	6.62	6.59	7.11
Italy (lira)	2,232	2,214	2,306	4,920	4,881	5,084
Japan (yen)	224.10	224.55	250.56	494.06	495.05	552.38
Netherlands (guilder)	3.37	3.36	3.64	7.43	7.40	8.03
South Africa (rand)	3.87	3.83	3.60	8.52	8.44	7.94
Spain (peseta)	198.54	200.42	226.56	437.71	441.86	499.47
Sweden (krona)	10.54	10.63	11.29	23.25	23.44	24.90
Switzerland (franc)	2.49	2.47	2.64	5.49	5.44	5.83
UK (pound)	.96	.96	1.08	2.12	2.11	2.39
US (dollar)	1.80	1.80	1.80	3.97	3.97	3.97

SWU VALUE AND UF_6 VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

	SWU Value at 0.30% Tails Assay (Apr 30, 1988)	SWU Value at 0.30% Tails Assay (Mar 31, 1988)	UF_6 Value per kg U as UF_6 This Month (Apr 30, 1988)	UF_6 Value per kg U as UF_6 Last Month (Mar 31, 1988)
Australia (dollar)	89.65	94.68	59.65	61.54
Belgium (comm. franc)	2,375	2,446	1,581	1,590
Canada (dollar)	83.64	86.48	55.65	56.21
EEC (ecu)	54.76	56.34	36.43	36.62
Finland (markka)	271.24	281.01	180.49	182.65
France (franc)	385.49	394.14	256.51	256.19
FRG (mark)	113.48	116.24	75.51	75.55
Italy (lira)	84,315	86,101	56,107	55,966
Japan (yen)	8,466	8,733	5,634	5,676
Netherlands (guilder)	127.27	130.60	84.69	84.88
South Africa (rand)	146.08	148.90	97.20	96.78
Spain (peseta)	7,501	7,794	4,991	5,066
Sweden (krona)	398.36	413.47	265.08	268.75
Switzerland (franc)	94.08	95.93	62.60	62.35
UK (pound)	36.27	37.20	24.13	24.18
US (dollar)	68.00	70.00	45.25	45.50

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on the last working day of the month.

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CURRENT MARKET DATA

RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price Range as Percent of Current Exchange or UF_6 Value[2]	Seller	Buyer	Remarks
4289	1988	101 - 300	93-97	Intermediary	Utility	

Enrichment Services
Secondary Market Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity[4] (thousands of SWU)	Approximate Price Range as Percent of Current SWU Value[5]	Seller	Buyer	SWU Origin	Remarks
4290	1989	less than 50	103-107	Intermediary	Utility		

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] Where US-origin material is involved, the range is based on the Exchange Value (or UF_6 Value) *plus* the premium (relative to the Exchange Value or UF_6 Value). The range reflects five percentage points (inclusive) per grouping, centered about the middle of the range.
[3] The notation R means that Nuexco either does not know, or that Nuexco has restricted that information to protect client or source confidentiality.
[4] If tails assay is unknown or unspecified, Nuexco's calculation of SWU quantity assumes 0.30 w/o tails assay.
[5] Prices are usually normalized to 0.30% tails assay. Refers to SWU Value that corresponds to SWUs included in transaction. When prices and SWU values are expressed as discounts from a reference price (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.

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URANIUM SUPPLY
(April 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
87-1002	270	—	
87-1023	500	500 per year	1988-90
87-1061*	1,000	700 per year	1988-91
87-1123*	1,000	1,000 per year	
87-1141	500	200 per year	1989-92
87-1152*	300	—	1988
87-1159	60	—	
87-1161	1,000	1,000 per year	UF_6
88-1000A*	140	—	U_3O_8 or UF_6
88-1000B	80		1988, UF_6
88-1001*	200	200 per year	1988-91
88-1026	250	—	1988
88-1033A*	130	—	1988, UF_6
88-1036	100	—	1988
88-1041*	90	—	UF_6
87-1001*	—	500 per year	1989 on
87-1005*		250 per year	1988-95
TOTAL:	5,620		
INACTIVE			
87-1019*	1,000	1,000 per year	1988-91
87-1041*	650	—	UF_6
87-1053	100	400 per year	1989 on
87-1130*	550	—	
87-1135	260	—	UF_6
87-1136	260	—	UF_6
TOTAL:	2,820		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 87-1156.

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CURRENT MARKET DATA

URANIUM DEMAND
(April 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
88-1035A	40	—	1988, UF_6e
88-1045	225	525	1989-90, UF_6
88-1060*	300	—	1988, U_3O_8/UF_6
87-1064*	400	400 per year	1988-90
87-1069*	50	—	1988
88-1072*	100	—	1988
88-1075A*	50	—	1988, UF_6e
87-1013	—	1,200 per year	1990-95
87-1021*	—	200 per year	1992-99
87-1134	—	260	1989
87-1172	—	500 per year	1990 on
88-1044	—	2,400	1991-95
88-1056	—	500 per year	1989-93, U_3O_8 or UF_6
88-1062*	—	200 per year	1990-on
TOTAL:	1,165		
INACTIVE			
87-1154A	80	—	1988, UF_6e
88-1014	190	—	1988
87-1163*	—	160	1989-93
87-1166	—	650	1989, UF_6
TOTAL:	270		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]Scheduled delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 87-1121, 87-1040, 88-1013A, 88-1017A.

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LOAN SUPPLY AND DEMAND
(April 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
87-1012	2,000	—	
87-1071	1,000	—	UF_6
87-1157	4,000	—	
88-1057*	600	—	
TOTAL:	7,600		
INACTIVE			
87-1031	1,000	—	
87-1033	1,000	—	
TOTAL:	2,000		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month:

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CURRENT MARKET DATA

CONVERSION SUPPLY AND DEMAND
(April 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale			
INACTIVE			
87-1008*	770	475	1988
TOTAL:	770		
Inquiries to Purchase:			
ACTIVE			
88-1034*	750	—	1990
TOTAL:	750		
INACTIVE			
88-1021	65	—	
88-1059*	100	—	UF_6
TOTAL:	165		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 88-1004.

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SWU SUPPLY AND DEMAND
(April 30, 1988)

Nuexco Project Number	Delivery Period[1] (Thousands of SWU) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
87-1058	90	—	1988
87-1068*	200	—	1988,UF6e
88-1033B	15	—	1988,UF6e
TOTAL:	305		
INACTIVE			
87-1004	55	—	1988
87-1128*	360	—	1988
TOTAL:	415		
Inquiries to Purchase:			
ACTIVE			
88-1035B	20	—	1988, UF6e
88-1058*	150	—	
88-1074*	80	—	1988
88-1075B*	10	—	1988, UF6e
TOTAL:	260		
INACTIVE			
87-1154B	20	—	1988, UF6e
TOTAL:	20		

*New or revised since last month.
[1]Measured from the date of this Report.
[2] For delivery within one year. This category excludes SWU deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 87-1065, 87-1171, 88-1013B, 88-1017B, 88-1050.

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RECENT DEVELOPMENTS

SWEDEN

The Swedish government introduced a new energy bill to its Parliament on March 2, 1988, scheduling the first two nuclear reactor shutdowns. This action represents the first substantial shutdown plan following Sweden's 1980 referendum vote to phase out its twelve nuclear power plants by 2010 (see Report #196, December 1984). The bill calls for the permanent closure of one of the Barseback units and one of the Ringhals units in 1995 and 1996. While the legislation is expected to be passed by Parliament in May or June without any major revisions, certain vague provisions concerning shutdown costs and energy replacement may be clarified as it is debated.

Although the actual reactors to be shut down will not be determined until 1990, the Barseback and Ringhals stations were selected because of their proximity to highly populated areas. Sydkraft's Barseback station, located on Sweden's southwest coast, has long been a candidate for early closure because over two million people live within a fifty kilometer radius of the plant. The Barseback station is only about 20 kilometers across the Straits of Oeresund from Copenhagen, Denmark, the largest city in Scandinavia. The Danish public and government's strong anti-nuclear sentiment was an important factor in Sweden's selection of Barseback for early closure.

Sydkraft vigorously opposes decommissioning Barseback, and reportedly is seeking about US $2.5 billion in damages for having to retire the plant before the end of its useful life. Sydkraft also announced it would build the largest coal-fired plant in Europe if its nuclear plants were closed, even though the government has stated that it will not approve any large coal-condensation plants.

The four-unit Ringhals station, also situated on Sweden's coast south of Gothenburg, is operated by the Swedish State Power Board (SSPB). Approximately 300,000 people live within 50 kilometers of the station.

The energy bill did not specify how utilities would be compensated nor how the government planned to replace nuclear energy. The government believes an aggressive energy conservation program will compensate for most of the electricity generating capacity cancelled, based on its estimates for total energy consumption in the late 1990s of 135-140 TWh (total consumption in 1987 was 129 TWh). A review of the situation is planned for 1990, after further study of long-term energy requirements and replacement options, and the future direction of the Swedish energy program will be decided at that time.

According to some reports, the phase-out of nuclear power in Sweden could cause the cost of electricity to more than double each year until the mid-1990s, and the SSPB has warned of increasing power shortages, already a common problem in recent winters due to insufficient generating capacity. Sweden's successful nuclear operating history, high capacity factors, indigenous reactor supply infrastructure, and comprehensive waste program make the early closure of units all the more problematic.

USA

US Supreme Court Holds Hearing on the US Producers vs. DOE Lawsuit

The Supreme Court heard oral arguments in the US Producers vs. DOE lawsuit on April 27, 1988. Mr. Thomas Merrill, the Deputy Solicitor General from the Department of Justice, represented DOE; Mr. Peter Nickles of the Washington law firm, Covington & Burling, argued on behalf of the US Producers. Each party had 30 minutes to present its side of the case and to answer questions from the nine Supreme Court Justices. Both parties had expected the Court's line of questioning to center on the statutory interpretation of Section 161(v) of the Atomic Energy Act, the interpretation of which is critical to the issue of whether DOE has discretion or is required to apply restrictions on the enrichment of non-US uranium when the Secretary of Energy has declared the domestic uranium industry to be non-viable. Instead, the Justices focused the majority of their questions on the definition of industry "viability". Additionally, in an unusual move, the Justices cut short both attorneys' preamble by beginning the questioning early in the session.

The Court queried Mr. Merrill for the first 30 minutes, beginning with a request for clarification of the definition of viability and whether it meant financial profitability or the ability of the industry to satisfy 100 percent of the domestic nuclear power industry needs. Mr. Merrill's response that financial profitability was not necessarily an indicator of viability elicited further questioning with Justice O'Connor expressing difficulty in understanding how a domestic industry could be available to meet national needs if it couldn't make any money. Mr. Nickles was presented with similar questions concerning viability and when asked by Justice Scalia if his definition of viability was the ability of the industry to meet the nation's

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civilian and military requirements in the event of a cutoff of non-US uranium, Nickles acknowledged he was in agreement with DOE on that point.

DOE has repeatedly asserted that enrichment restrictions would actually be counterproductive and would not help the domestic uranium industry in the long run. Mr. Merrill stated, "...the Secretary's position is that because Section 161(v) applies only to enrichment of raw uranium and does not restrict imports of enriched uranium and because there are now two European consortia that actually compete with DOE to provide enriched uranium, that the imposition of restrictions on unenriched uranium would simply induce domestic utilities in large numbers to flee overseas to these other competitors of DOE and purchase enriched uranium for direct import into the United States. So, for that reason, at this point in time, even though imports are a fairly large aspect of the picture, the particular mechanism that Section 161(v) establishes would not provide any relief to the industry."

The Court was also interested in clarification of whether Congress meant to subsidize the uranium industry through import restrictions if such subsidization would result in a less than 100 percent viable industry. Following Mr. Nickles' affirmation, Justice Scalia said, "We've got a clash of very difficult positions here".

The case is unusual for several reasons. The statutory language of Section 161(v) was written over 20 years ago when the private sector of the US uranium industry was in its infancy. One undisputed intent of Section 161(v) at that time was to encourage the privatization of the enrichment industry, previously a virtual government monopoly, and to ensure sufficient uranium resources for domestic requirements and national security. However, in the context of the changed circumstances of the 1980s, the statute's impact is substantially altered.

Governmental agencies have usually received deference in interpreting the meaning of the statutory language which they have been authorized to implement. This deference, however, was not sufficient to persuade the US District and Tenth Circuit Courts that, in this case, the DOE interpretation of the statute was correct. The lower courts have not focused on analyzing the wording of Section 161(v), "...to the extent necessary to assure the maintenance of a viable domestic industry", but rather have based their rulings on the literal interpretation of the word "shall", as mandating restrictions on the enrichment of non-US-source uranium if the domestic industry is determined to be non-viable. The Supreme Court, however, indicated several times that there may be questions of fact that the lower courts had left unanswered (primarily relating to viability), thus raising the possibility of a remand to the district court for findings on these issues.

As a rule, the Supreme Court does not review a case unless:

1. it presents a unique legal point
2. there are conflicting decisions between circuit courts; or
3. its potential impact would be widespread and significant.

The outcome of this litigation will have far-reaching effects on the domestic mining industry, the government's enrichment business, and relations with major trade partners, especially Australia and Canada, who both filed briefs in support of DOE. Whether this was a major factor in the Supreme Court's consideration of the case is unclear.

Some possible outcomes of the hearing include:

1. The Supreme Court decides in favor of the US Producers on the statutory interpretation of Section 161(v) and remands back to the District Court to make findings of fact (which have essentially been ignored in the case) as to the level of import restrictions necessary to make the domestic mining industry viable. The District Court would probably require the DOE to conduct a rulemaking on the issue, pursuant to its original order.
2. The Court decides in favor of DOE on the statutory interpretation of 161(v) and remands back to the District Court to determine if any restrictions would restore viability to the industry.
3. The Court does not decide in favor of either party and remands back to the lower courts to examine the viability and restriction level issues.

These are but three of several possible results, but any one of them will cause the legal process to start over again and further prolong this already lengthy litigation. A remand will work in favor of DOE, as it is almost certain that the Stay of Judge Carrigan's order requiring DOE to restrict enrichment of imports would remain in place. This litigation then would take a back seat to the anticipated impact of a ratified Free Trade Agreement (FTA) or the enactment of legislation such as S.2097, the *Uranium Revitalization, Tailings Reclamation and Enrichment Act of 1987*. In any event, a ruling should be made before the Supreme Court recesses in June.

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ANALYSIS AND COMMENTARY

THE US URANIUM REVITALIZATION, TAILINGS RECLAMATION AND ENRICHMENT ACT,TITLE I

On November 4, 1987, the US Senate Committee on Energy and Natural Resources reported out to the Senate bill number S.1846 (*Uranium Revitalization, Tailings Reclamation and Enrichment Act of 1987*). In early 1988, the bill was reintroduced as S.2097, without some of its earlier provisions that had caused jurisdictional conflict with the Senate Finance Committee. One of the deleted provisions comprised most of Title I of S.1846, dealing primarily with establishing a fee on the use of imported uranium by US utilities. These provisions were reintroduced by amendment on the floor of the Senate on March 30, 1988. In a key vote, a motion to block the reintroduction of the deleted provisions was defeated by a 47-45 margin. The full bill S.2097, again with uranium import provisions, was subsequently passed by a vote of 62-28 in the Senate. The bill now goes to the US House of Representatives for its consideration.

Key members of House committees having jurisdiction over such matters seem to be favorably disposed to the US uranium industry, but opposed to the bill's provisions on uranium enrichment. The Reagan Administration has stated that it can accept the uranium enrichment provisions of S.2097, although the Administration would like to see immediate full privatization of the enrichment enterprise. However, key officials within the Administration have stated privately that the uranium import usage fee provision is unacceptable because of its trade-protectionist nature, and that this provision alone would prompt a Presidential veto of the bill.

This bill is the "rebirth" of bill S.1004, introduced in the previous (99th) Congress. As the bill's proposed title implies, it contains provisions to "revitalize" the US uranium industry by imposing a sliding fee on the US consumption of imported uranium, sets up a mechanism for funding the cleanup of uranium mill tailings at active (i.e., licensed) mill sites, and requires the formation of a government corporation to own and operate the US uranium enrichment enterprise.

From the standpoint of the world uranium market, the most important provision of S.2097 is the import usage fee in Title I. (Title I is reproduced in its entirety at the end of this article.) The sliding-scale fee is to be collected from US utilities at the time of loading new fuel assemblies into each power reactor, and the per-kilogram fee is based on the percentage of the newly loaded fuel that is derived from imported uranium (Table 1).

Table 1
Proposed Usage Fees for Non-US Uranium

Fee Rate	Fraction of Assemblies' Mass of Non-US Origin
No Fee	First 37.5% of mass that is non-US origin
$200/kg	Fraction of mass comprising between 37.5% and 55% non-US origin
$250/kg	Fraction of mass comprising between 55% and 60% non-US origin
$350/kg	Fraction of mass comprising between 60% and 70% non-US origin
$400/kg	Fraction of mass comprising between 70% and 80% non-US origin
$500/kg	Fraction of mass comprising more than 80% non-US origin

Beginning January 1, 1995, there would be no fee on the first 50 percent non-US origin fraction in newly-loaded assemblies. The revenues from this fee would be put directly into the general treasury fund of the United States.

The calculation of the usage fee is based on a concept called "Equivalent Uranium" in the Act. The term refers to the sum of any natural (unenriched) uranium loaded into a fuel assembly and the natural uranium required to produce the assembly's enriched uranium, based on the US DOE's Standard Table of Enrichment Services and the actual tails assay under which the enrichment services were ordered . "Equivalent" specifically excludes any uranium involved in "overfeeding" (i.e., the uranium in excess of an enrichment customer's delivered feed material required to produce a given quantity of enriched uranium, when the enricher operates his plant at a higher tails assay than the one specified in the enrichment transaction).

In essence, a reactor owner loading fresh assemblies, derived in part or whole from non-US-origin uranium, would calculate the non-US-origin fraction of newly loaded fuel's equivalent uranium, and apply that percentage to the fuel's enriched uranium mass to determine (on the basis of the above table) the applicable usage fee for a given calendar year. The usage fee applies

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to the aggregate of fuel in assemblies loaded in a given year into all nuclear power plants owned by a company ("licensee"). Furthermore, if through a parent relationship one corporation owns several "licensees," the percentage calculated is based on the parent corporation's aggregate nuclear fuel assemblies.

Estimating the impact of this US import usage fee, $100 per kilogram translates into approximately $5 per pound of U_3O_8. Thus, the first level of this import fee ($200 per kilogram) corresponds to about a $10 per pound U_3O_8 price "indifference" between US and non-US uranium. Thus, if US uranium is selling for no more than $10 per pound higher than non-US uranium, a US utility would buy the US uranium to have cheaper overall costs for the 37.5-55 percent of his fuel. For this reason, the import usage fee would result in a two-tiered uranium market price—one tier for non-US uranium and a higher-priced tier for US uranium. This, of course, assumes a competitive market among suppliers and a US uranium industry that cannot supply all US utility needs.

S.2097 contains important "grandfathering" provisions. If the US utility's non-US uranium is obtained under a contract that was entered into prior to September 8, 1986, that non-US uranium is exempt from the fee. In fact, if the grandfathered contract is with a domestic supplier and the contract terms allow the supplier to select the national origin of the uranium to be delivered, the supplier would be allowed to purchase non-US uranium after September 8, 1986, to deliver under that contract and the uranium would still be exempt from the fee calculation.

The grandfathering provision specifically states that it applies to contracts in which the quantity of non-US uranium to be delivered is fixed, and for which the dates of delivery may be flexible. On the other hand, the provision specifically excludes from grandfathering (i.e., includes in the calculation of the usage fee) any non-US uranium delivered under an option exercised or created by an amendment to a contract after September 30, 1986.

It is important to note that the non-US uranium obtained from grandfathered contracts is not treated as US-origin uranium, rather it is merely exempt from the usage fee. Furthermore, it is treated as the first non-US uranium loaded in a given year. For example, if 50 percent of a utility's newly loaded fuel is from non-US uranium, of which 40 percentage points are from grandfathered contracts, the 10 percent from non-grandfathered contracts would be liable for the fee of $200 per kilogram, since it constitutes a marginal fraction in the 40-50 percent non-US range.

Another provision of S.2097 covers the extent to which changes of national origin of uranium (referred to as "flag swaps" in the bill) will be permitted. The definitions section of the bill states that domestic uranium is uranium mined in the USA, including "uranium recovered from uranium deposits in the USA by underground mining, open-pit mining, strip mining, in-situ recovery, leaching, and ion recovery, or recovered from phosphoric acid manufactured in the USA." Any other uranium is deemed non-US uranium.

Under certain circumstances, the national origin (i.e., US versus non-US) may be exchanged between two lots of uranium by the two owners of the lots. If the owners of the lots involved in a transaction have accomplished the transaction in compliance with all applicable regulatory requirements, and if the lots of uranium are at the same location in the custody of a third party (and in actuality or by reasons of the third party's accounting practices the uranium lots are commingled), the transaction would be an allowable way to obtain US-origin uranium for the same quantity of non-US-origin uranium.

Any change in national origin occurring on or before January 1, 1986, would be recognized for purposes of the usage fee calculation, if such origin change is reflected on the first DOE/NRC form 741 applicable to that lot after the origin change. Any origin changes taking place after January 1, 1986, would be allowed if:

1. Equal quantities of uranium, based on the equivalent amount of feed for enriched uranium, were involved in each side of the transaction and there were no increase in the quantities of uranium designated as foreign and domestic;

2. None of the uranium involved had been loaded into a reactor, irradiated, contained in enrichment tails material or other by-product of processing or materials owned by the US Government; and

3. The transaction complied with all applicable regulatory requirements at the time of the transaction.

The Secretary of Energy is required to promulgate, within six months after passage of the Act, regulations governing the characterization of national origin consistent with the purpose of the Act.

The bill also contains provisions to repeal Section 161(v) of the US Atomic Energy Act (as amended in 1964). Section 161(v) requires the US Department of Energy (as the successor to the defunct Atomic Energy Commission) to restrict its enrichment of non-US-origin uranium, to the extent necessary to maintain a viable US uranium industry. The lawsuit filed by several US uranium producers against

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the DOE (which is currently before the US Supreme Court) focuses on this provision of the law. Finally, the bill also defers the requirement that the Secretary of Energy make a determination each year of the US uranium industry's viability. The Secretary would be required to report such a determination for the years 2000 through 2011.

There has been an attempt to directly link the uranium import provisions of S.2097 to the US-Canada Free Trade Agreement (FTA). In a December 1, 1987 letter from 25 US Senators to President Reagan, the Senators argued that S.2097 (or S.1846 as it was referred to then) repeals Section 161(v) of the Atomic Energy Act and is, thus, consistent with the principles of the FTA dealing with uranium. Furthermore, they argued, S.2097 provides for a phaseout of import restrictions by moderating the import fee schedule in 1995 and totally eliminating the import usage fee after the year 2000. This is consistent with the gradual phaseout in the FTA for other trade barriers, in the opinion of these Senators.

Although there has been no formal response to the December letter, officials within the Administration strongly disagree with the letter's contentions. In the Administration's view, there is no uranium import restriction now; thus, the phaseout argument is ludicrous. The Senators' letter implied that DOE is illegally avoiding the imposition of imported uranium enrichment restrictions, as required, in their opinion and the opinion of two US courts, by law.

TITLE I - URANIUM REVITALIZATION

SEC. 110. DELETION OF SECTION 161v. - Subsection 161v. of the Atomic Energy Act of 1954, as amended, is deleted and the remaining subsections are relettered accordingly.

SEC. 111. AMENDMENT TO SECTION 170B. - Section 170B of the Atomic Energy Act of 1954, as amended, is further amended by deleting "1983" and substituting "2000", by deleting "1982" and substituting "2000", and by deleting "1992" and substituting "2011" in both places it appears.

SEC. 112. IN GENERAL. - Any licensee of a civilian nuclear power reactor with fuel assemblies loaded after December 31, 1987, and prior to January 1, 2001, that contain foreign uranium shall be assessed and pay the charges, to be imposed and collected by the Secretary, as provided in section 113, except as provided elsewhere in this title.

SEC. 113. CALCULATION OF CHARGES. -

(a) The charge to impose by the Secretary pursuant to section 112 shall be, subject to section 115, calculated upon the percentage of foreign uranium included in the aggregate of new fuel assemblies loaded into all of the civilian nuclear power reactors owned or operated by any one licensee or the licensees owned by one corporation during any calendar year as follows:

$0.00/kg on the kilograms of foreign uranium which comprise the first 37 and one-half per centum of the total weight of the uranium in new fuel assemblies loaded in such year.

$200/kg on the kilograms of foreign uranium which comprise the percentage of the total weight of the uranium in new fuel assemblies loaded in such year greater than 37 and one-half per centum, but less than or equal to 55 per centum.

$250/kg on the kilograms of foreign uranium which comprise the percentage of the total weight of the uranium in new fuel assemblies loaded in such year greater than 55 per centum but less than or equal to 60 per centum.

$350/kg on the kilograms of foreign uranium which comprise the percentage of the total weight of the uranium in new fuel assemblies loaded in such year greater than 60 per centum but less than or equal to 70 per centum.

$400/kg on the kilograms of foreign uranium which comprise the percentage of the total weight of the uranium in new fuel assemblies loaded in such year greater than 70 per centum but less than or equal to 80 per centum.

$500/kg on the kilograms of foreign uranium which comprise the percentage of the total weight of the uranium in new fuel assemblies loaded in such year greater than 80 per centum.

(b) (1) For calendar years after December 31, 1994, no charge shall be imposed on the kilograms of foreign uranium which comprise the first 50 per centum of the total weight of the uranium in new fuel assemblies loaded in such year.

(2) There shall be no charge imposed on foreign uranium excluded from the charge by section 115. The foreign uranium excluded from the charge by section 115, shall be deemed the first foreign uranium contained in the aggregate of new fuel assemblies loaded into all of the civilian nuclear power reactors owned or operated by any one licensee or the licensees owned by one corporation during any calendar year for purposes of calculating the charges to be paid under this section.

SEC 114. CORPORATIONS OWNING MORE THAN ONE LICENSEE AND REACTORS WITH MULTIPLE OWNERS. -

If a corporation owns more than one licensee, the percentage of foreign uranium which shall be considered included in new fuel assemblies loaded by each licensee owned by such corporation during a calendar year shall be the percentage of foreign uranium included in the aggregate of all new fuel assemblies loaded during such calendar year into all civilian nuclear power reactors

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owned by such corporation. Where a civilian nuclear power reactor is owned by more than one utility, an owner may, by mutual agreement with the other owners, elect to aggregate the pro rata share of new fuel assemblies in that plant with the pro rata shares of new fuel assemblies loaded in other civilian nuclear power reactors owned or operated by such owner.

SEC. 115. EXCLUSION FROM CHARGE.-

(a) In making the calculation of charges required in section 113, a charge shall not be assessed on foreign uranium that is included in new fuel assemblies loaded in all civilian nuclear power reactors owned or operated by any one licensee or the licensees owned by one corporation during any calendar year if such uranium has been obtained under the terms of a contract for the purchase of uranium entered into prior to September 30, 1986, between the licensee or the corporation owning the licensees of such civilian nuclear power reactors and the supplier, including:

(1) such a contract under which the quantity of uranium to be purchased is fixed but with flexibility as to date of delivery; and

(2) such a contract with a domestic supplier that allows the supplier to select the national origin of the uranium delivered.

(b) Foreign uranium that is included in new fuel assemblies loaded into a civilian nuclear power reactor owned or operated by a licensee or the licensees owned by one corporation during any calendar year shall be subject to the charges assessed on foreign uranium if such uranium was obtained under the terms of contract, executed on or after September 30, 1986, or obtained under an option which was exercised on or after September 30, 1986. The increased quantities of foreign uranium obtained under a contract executed before September 30, 1986, but that is modified or extended after that date to increase the quantity of foreign uranium delivered, shall be subject to the charges imposed by section 113.

SEC. 116. DETERMINATION OF PERCENTAGE. -

The percentage of foreign uranium that shall be deemed to be contained in the new fuel assemblies loaded in a year shall be determined by dividing the weight of Equivalent Foreign Uranium by the total weight of Equivalent Uranium in such fuel assemblies. For the purpose of this calculation, fuel loadings during refueling outages that begin in one calendar year and are completed in the following year may be counted in either year but not both.

SEC. 117. FLAG SWAPPING. -

(a) For purposes of making the certification required under section 119 and calculating the charges imposed under this title, a characterization of the national origin of a particular lot of uranium shall be recognized as provided in this section.

(b) If the national origin of a particular lot of uranium has not been changed from the nation in which it was mined, the nation in which such uranium was mined shall be used for purposes of making the certification required under section 119 and calculating the charges imposed under this title.

(c) Any transaction in which a party tenders uranium having one national origin in return for receipt of uranium having a different national origin shall not be deemed to have involved a change in the national origins of the lots of uranium involved in the transaction if:

(1) the transaction is accomplished in compliance with all applicable regulatory requirements; and

(2) the lots of uranium involved in the transaction are held at the same location in the custody of a third party such that, in actuality or by reason of the accounting practices of the third party, the lots of uranium involved in the transaction are commingled.

(d) If the national origin of a particular lot of uranium has been changed on or before January 1, 1986, from the nation in which it was mined, and such changed origin is shown on a DOE/NRC form 741 applicable to such uranium as of January 1, 1986, or on the first DOE/NRC form 741 executed after that date and applicable to such uranium, then the national origin of such uranium as shown on the first DOE/NRC form 741 reflecting the last change occurring on or before January 1, 1986, shall be recognized for purposes of making the certification required under section 119 and calculating the charges under this title.

(e) If the national origin of a particular lot of uranium has been changed after January 1, 1986, from the country in which it was mined, from the national origin as shown on a DOE/NRC form 741 applicable to such uranium and recognized under subsection (d), or from national origin recognized under this subsection prior to the change in question, such change in question shall be recognized for purposes of making the certification required under section 119 and calculating the charges owed under this title if the change was part of an exchange of national origins that:

(1) to the best knowledge of the owner of the particular lot of uranium, involved equal quantities of uranium, calculated on an equivalent natural uranium basis, with no increase in the quantities of uranium designated as foreign and designated as domestic;

(2) to the best knowledge of the owner of the particular lot of uranium, involved no uranium that has been loaded into a reactor, irradiated, contained in enrichment tails material or other by-product material of processing (including materials lost or unaccounted for) or materials owned by the United States Government; and

(3) complied with all applicable regulatory requirements at the time of the exchange, including regulations promulgated under subsection (f).

(f) The Secretary shall promulgate regulations within six months after the date of the enactment of this title that, to the extent reasonable and practicable, ensure that the purposes of this title are realized in the characterization of the national origin of uranium under this section.

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(g) For purposes of this section, the term "uranium" shall include natural uranium and natural uranium equivalents.

SEC 118. DISPOSITION OF CHARGES. -

The charges imposed by this title, and collected by the Secretary, shall be deposited within sixty days after the certification required in section 119 in the general fund of the Treasury of the United States as miscellaneous receipts.

SEC. 119. CERTIFICATION. -

The owner or operator of any civilian nuclear power reactor must certify to the Secretary by March 1 of each year the following information for the previous calendar year:

(a) the total weight of uranium in new fuel assemblies loaded during such year;

(b) the total weight of foreign uranium included in new fuel assemblies loaded during such year;

(c) the total weight of foreign uranium included in new fuel assemblies loaded during such year which is excluded from the charge pursuant to section 115;

(d) the total weight of domestic uranium included in new fuel assemblies loaded during such year;

(e) the isotopic enrichment assays and tails assays employed in ordering enriched uranium used in the respective fuel assemblies during such calendar year; and

(f) the equivalent natural uranium for each quantity of enriched uranium reported.

SEC 120. GOVERNMENT URANIUM PURCHASES.

(a)(1) After the date of enactment of this Act, the United States of America, its agencies and instrumentalities, shall not enter into contracts or orders for the purchase of uranium other than for domestic uranium: Provided, that this section shall not affect purchases under a contract for delivery of a fixed amount of uranium entered before the date of enactment of this Act, or options exercised for fixed amounts prior to the date of enactment of this Act.

(2) The use of natural uranium contained in stockpiles or inventories owned by the United States, including its agencies and instrumentalities, shall be restricted to military purposes and Government research and to overfeeding and pre-production of enriched uranium by the United States Enrichment Corporation. The amount of natural uranium together with the amount of natural uranium equivalent of enriched uranium contained in stockpiles or inventories owned by the United States, including its agencies and instrumentalities, as of the date of enactment of this title shall, to the extent practicable, not be reduced except for military purposes, overfeeding, or Government research purposes.

(b) Subsection (a) shall not apply to the Tennessee Valley Authority.

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A PROGRAM FOR PRESERVING AND ADVANCING NUCLEAR POWER IN THE USA

By J. Robert Wolcott
Chairman, Nuexco/Concord International
Advisory Committee

Mr. Wolcott, the former Chairman of Nuexco, is now Chairman of the Nuexco/Concord International Advisory Committee. Mr. Wolcott's views, as outlined in this essay, are set forth to stimulate thought and discussion, and do not necessarily represent those of Nuexco.

In this essay, Mr. Wolcott expands on the theme that he first developed in an earlier paper entitled A National Strategy For Nuclear Power *(Report 229, September 1987). In these papers Mr. Wolcott presents the thesis that, on one hand, the incentive structure presently provided by the government is such that a US nuclear industry will not arise again, even though national needs may require it. On the other hand, even if positive government support were to emerge, the industry is not conceptually organized to respond to the social, economic, political, and environmental forces — in other words, the real market.*

Mr. Wolcott's previous paper dealt with a general strategy for meeting real market needs, which are much different than those prevailing at the time the concepts now in use evolved. To fill part of the need, a large-scale prototype program was proposed to overcome anachronistic conditions and to prepare for a "Second Era."

Among other things, the program called for construction of two large prototype (but nevertheless commercial-sized) light-water reactors, two reactor facilities for technology demonstrations, and one integrated fuel cycle project. The Idaho National Engineering Laboratory was proposed as the most advantageous site in the USA. This paper expands on the rationale for that prototype program.

Introduction

In the USA, utilities are very unlikely to begin ordering any new nuclear plants for use before the year 2000. Too many obstacles currently exist. On the other hand, long-term influences ultimately will force construction of more nuclear units. The problem is whether to do nothing now, and wait until economic forces dictate action, or begin meaningful preparations for the future.

Approximately 100 nuclear plants currently are operating in the USA and another dozen will start up within the next few years. Completion of those plants will mark the end of new startups for more than a decade to come. Many nuclear facilities have already operated for 10 to 20 years, and in some cases longer. While the average operating lifetime of nuclear stations has yet to be determined, 30 to 50 years is usually assumed. Therefore, as plants age, decommissioning will be necessary and the number of operating units will steadily decline. Nuclear energy production will peak (after new startups) at approximately 20 percent of total national electricity production and, as decommissioning accelerates, will decline towards zero during the first few decades of the next century.

All types of power plants age and must eventually be replaced. Furthermore, even taking into account modest growth and ever improving conservation, increasing demand will require the building of several hundred new electrical generating facilities during the next several decades. What types of generating plants will be built is not clear. Will coal satisfy all our needs? Most unlikely. Oil? Out of the question. Natural gas? A share. Hydro? Few new dams will be built. Passive energies, such as solar? A minor fraction. Do without nuclear power? Most unlikely.

The Need for a Fresh Start

One might reasonably ask why, after building and operating over 100 nuclear plants, dominating the overseas reactor market for 20 years, and providing technology for most other nations' domestic nuclear industries, should the USA consider a prototype program? The answer has to do with the clearly foreseeable gap in nuclear plant construction. Under present conditions, no new nuclear plants are being started. However, at the end of a 10 or 20 year period, a growing need may force a rapid expansion in nuclear construction.

An industry that must grow, and may grow rapidly in the future for reasons of national self-interest, deserves investment and preparation. Old designs will not satisfy tomorrow's market. Concepts developed in the 1960s and 1970s have been modified and modified again to meet regulation after regulation. Complexity has been piled on complexity. As a result of this chaotic situation, many observers have

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concluded that a high degree of standardization must be applied in the future.

In the USA, technology has continued to advance, but largely in conceptual terms. Improved safety, reduced cost, increased reliability and shorter construction schedules all are possible, but they are most likely to be assimilated in one or two, not several, design types. To attempt to test new technology without a prototype as a model would merely repeat the experiences of the past 15 years.

It is unlikely that a utility would commit to build a plant whose design has not been proven. Even a management willing to do so would find that regulatory organizations, consumers, and investors would make it most difficult. All such groups would want a way of allowing careful estimates of regulatory risk, safety, cost, and schedule.

A sound approach to the future requires understanding the past. One study, published in July 1987, analyzed 113 US nuclear plants to determine why costs and schedules had increased so dramatically. The study's conclusions included the following:

1. Between 60 percent and 80 percent of recent plant costs are due to the direct and indirect impact of regulations.

2. Costs of plants started after September 1970, increased at an annual compound rate of 17.7 percent (some 10 percentage points above the rates for monetary inflation alone) while labor and material quantities required have grown approximately 10 percent per annum.

3. Doubling of plant size increases cost by only 50 percent.

4. Each additional year of construction time increased costs by 14.7 percent.

5. Costs for similar plants in various regions varied as much as 50 percent; the highest costs were in southern California and the northeast central areas. Regional location also affects how long plants have taken to build.

6. US-design reactors built elsewhere in the world cost far less than they do when built in the USA.

7. In one situation, two similar reactors were built in the same area. The first was completed in 1976 for $460 million and the second in 1983 for $3.4 billion. The latter required twice as much concrete, large pipe and cable, and 6 times more electrical conduit. The first plant was completed in five years, and the second in eleven.

Scope of a Prototype Program

The program proposed in this essay may not be precisely described by the term "prototype", as used in a conventional sense. The program would actually involve two commercial-size power generating plants, as well as two development-oriented reactor units, and a general purpose back-end fuel cycle project. The program would serve separate, but complementary, purposes.

1. Two light-water reactor projects should be built by competing suppliers. One might be a boiling water reactor (BWR) and the other a pressurized water reactor (PWR), or the BWR or PWR might be used for both prototypes. The result, in either case, should be two competing *standard* designs. Plants should be built in the same area and constructed and operated under similar conditions for comparison. Sizes should be in the range of 300 to 900 MWe (maybe larger if economics requires) so as to serve effectively as standardized models and as actual power-generating facilities.

2. Another facility should be a High Temperature Gas Reactor (HTGR). HTGR development programs have continued for many years. A next, and major, step is needed, otherwise research and development may pass the point of diminishing returns. If this next step aims to produce a standardized design, a large module may be in order — up to several hundred megawatts of electric capacity. If the prototype merely aims to provide technology for a standardized design to follow, a small unit may be preferable.

3. The Integral Fast Reactor (IFR) is in a stage of development comparable to that of the boiling water reactor in the mid-1950s. The primary concerns now are determining more of the unique potential for inherent safety, fuel and fission products recycling, nonproliferation protection, and others, as they might apply to a commercial unit. Those considerations suggest a prototype in the 50- to 150-MWe range, or possibly only a reactor without electrical power generation.

4. An integrated fuel cycle program should aim to minimize stored waste, returning fuel and fission products to the reactors for recycling, and lessening radioactive waste shipments.

These development programs are complementary in time and purpose. The light-water reactor program has relatively short-term goals and can take advantage of the vast background of experience and technology. The HTGR, considerably less developed, could be a later competitor to

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light-water reactors. The IFR is a project whose technology, once proven, may provide a number of advantageous solutions for the longer term. The fuel cycle program serves the needs of all types of reactors in varying degrees. Finding solutions to the problems currently besetting today's nuclear power program will help to lessen, and hopefully remove, some psychological obstacles to nuclear power.

Comparisons with Japan

The USA and Japan have had a long, mutually profitable relationship in the field of nuclear power. Until a few years ago, nuclear commerce between the two countries followed an established pattern. The first units were developed, manufactured, and used in the USA, after which Japanese suppliers purchased the designs. The next step usually involved participation in joint projects, and was followed by Japanese manufacture of components under license. The pattern was repeated each time the American company introduced a significantly advanced model.

This pattern is changing and with it the role of leader. Japan's nuclear program is advancing and the US program is not. Japan respects US assistance and purchases engineering services and specialized manufacturing, but the lead now is being taken by Japan. The Japanese national program includes the following:

1. Continuing construction of proven reactor types in large-scale nuclear power sites.

2. Construction of two 1,300-MWe advanced BWRs with features for improved safety, reliability, and economics. The concept was largely a blending of American, Swedish and Japanese technology. The project is being conducted for Tokyo Electric Power Company (TEPCO) the world's largest private utility, for operation in the early to mid-1990s. Toshiba and Hitachi are the main Japanese suppliers, and General Electric Corp. (GE) is a subcontractor.

3. Kansai Electric Power Co. is constructing one or more advanced PWRs with similar features, for operation in the 1990s. Kansai is the owner. Mitsubishi Heavy Industries is the Japanese supplier, and Westinghouse is a subcontractor.

4. A Japanese company is expected to support another advanced boiling water reactor concept for a 600-MWe unit known as the SBWR (Simplified Advanced Boiling Water Reactor). Among its attractive features are "inherent safety," natural coolant circulation, and design simplicity. The original concept was developed by GE.

5. There are a variety of programs in which government and industry cooperate to advance development of fast breeder reactors, enrichment, waste disposal, and fuel cycle technology and applications.

Subcontracting to the Japanese program is extremely helpful to US firms and to the US program. *Suppliers in the USA are receiving more advanced light-water reactor support from Japan than from all US sources combined,* including DOE, the Electric Power Research Institute, utilities, and suppliers. Without that support, the USA would have little more than a paper program.

Japan has, or soon will have, about a 10-year lead in nuclear technology over the USA. If present trends continue, by the year 2000, Japan will have at least two advanced PWRs and two advanced BWRs in operation. Several more will be under construction. The USA will have none. The new SBWR prototype, and possibly a pressurized water reactor equivalent, also may be in operation in Japan. Japan will then lead the USA by two full models, both incorporating advanced safety and other features US users could not forego in any future ordering.

Nothing in the foregoing should be construed in any way as a criticism of Japan. Japan is doing the right things, even to the extent of helping the US industry. The USA is doing very little and in some cases the wrong things. Credit deservedly belongs to those who make the effort and investment to prepare for the future.

Use of the Idaho National Engineering Laboratory (INEL) As a Program Site

In choosing a site for a prototype center, several important requirements must be considered.

1. Use of an already established operation minimizes delays in the selection process;

2. A desirable site should already have facilities available to allow an efficient use of funds;

3. The site should have trained personnel available for expansion;

4. It should be located in a receptive community;

5. It should be assured of support by state and local governments;

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6. It should be located in a relatively unpopulated area to minimize concerns some may have about proximity of nuclear stations to population centers.

Three possible sites appear most favorable for a prototype program — the Hanford Reservation in Washington state, the Savannah River Complex in South Carolina, and INEL in Idaho. Each meets the foregoing requirements in varying degrees. The ill-fated Washington Public Power Supply System (WPPSS) program has left the attitudes of the public, and the state government in Washington, ambivalent towards nuclear development. Savannah River has specialized for nuclear weapons material production and is not known as a development center.

INEL has a large land area, and is located in a zone of modest population. Southeast Idaho provides a receptive community. Local, state and federal officials there are actively seeking new nuclear industry. INEL has development and operations experience of the type needed, and a substantial, reputable organization of trained personnel is available. Construction costs in Idaho are relatively low. A project may be affordable in Idaho where it would not be elsewhere. Future expansion can be accommodated. Power can be used locally and exported. In short, INEL offers substantial advantages.

The Need for Government Leadership

Strong government leadership is required if the US nuclear program is to be made viable. The leadership cannot come from industry, as much of it once did, and utilities are too cautious now to pursue a risky course. Even discussion of potential safety advancements, for example, may only encourage adding regulations and provide ammunition by those more interested in erecting obstacles than in making progress.

Self-imposed restraints further hamper aggressive industry leadership. The December 29, 1987, *Wall Street Journal* contained an article entitled "Nuclear Power's Secret" by Mr. Peter Beckmann, a professor emeritus of electrical engineering of the University of Colorado. His message is that "the nuclear power industry has been hiding a big secret"— namely that nuclear is far safer than coal. "The short answer," Professor Beckman argues, "is that its biggest clients, the utilities, mostly use fossil fuels, especially coal, and the nuclear power industry is loath to offend its potential customers. There is a well-kept truce between the nuclear industry and coal lobbies and neither wants to play up one against the other. Each has enough enemies as it is."

The further development of nuclear energy serves national interests (and therefore government interests) far more than industry interests. Industry will respond to a policy framework, but it cannot create that framework. The federal government, with its responsibilities for the environment, oil imports, long-term national fuel supply, etc. must provide those policies, for they are beyond the scope of any company.

One government option — the option currently being followed — is to do very little, believing that time and events will dictate the solution. The nation can wait until action is demanded, but there is the danger that waiting will only create new problems without any new solutions. What conditions are likely to prevail in a crisis situation? Will an oil crisis force overly rapid expansion? Will obsolete designs be used? Must we wait a decade or two before developing, constructing, and testing standardized plants? Or will standardization be waived in the interests of expediency? Will potential buyers of nuclear plants turn to overseas suppliers? These are a few of the many questions government would do well to consider in deciding whether, when, and how to act. And if preparatory action is to be taken, what conditions must government provide to restore innovation and investment?

Cultivating Public Support

In a report by the Committee For Energy Awareness, polls by Gallup and Cambridge Reports indicate that the public believes that the nation already depends about equally upon nuclear and coal (In fact, nuclear provides 18 percent of total electrical power and coal more than 55 percent.); that nuclear will be more important than coal in ten years (In fact, new startups beyond the few under way will not take place in the next ten years.); and that nuclear will become more important in the future. (In fact, decommissionings will gradually reduce market share.) More than two-thirds of the general public and an overwhelming majority of technical and scientific personnel support those positive views. Despite the positive views, however, less than one-fifth favor a nuclear plant in their area. This reservation must be accommodated by nuclear users whether they believe such a view is justified or not.

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A government attempt to initiate a nuclear restart involving a number of simultaneous new orders, such as occurred in the 1960s, would fail. It is doubtful that even one utility would respond without major changes in inducements as compared to those which exist. Years would be required for the approval of new locations. Industry must reshape to meet known public concerns and market conditions. If cities do not want nuclear plants nearby, we should build in receptive and sparsely populated areas. If the public wants the perception that more safety is being provided, we must make that a major design objective. If the public wants a clean environment, we must capitalize on nuclear power's intrinsic advantages. But we must adapt to these forces, and the change will take time and effort.

Energy is not a major part of today's political agenda. Presidential candidates appear uninterested or uniformed, or both. Pressure does not appear to be building for near-term use of nuclear power. However, productivity is gaining importance, and discussions of productivity lead to discussions of energy, and discussions of energy lead to discussions of nuclear power. When public interest reaches that point, government may once again find it desirable to have a strategy that takes account of public perceptions.

Meeting the Cost Challenge

Cost of the total prototype program will exceed the ultimate value of the facilities when used for power generation. That is because much of the work will be for research and development, but the benefits will be long term. The program actually has several categories, each of which has different cost and financing problems.

1. Light-Water Reactors — The two proposed reactor designs will be completely new. Engineering, manufacturing, construction, and startup costs will be higher than if those were spread over several identical plants. Ultimately, both plants will become permanent commercial generating units and will have high value. That value may not, however, be equal to the cost. Much depends upon the size chosen for the units. The larger the size, the more economically competitive they will be.

2. Integral Fast Reactor — Small-scale tests have been performed at INEL, but much more development will be needed before a major power producing station can be built. Much additional information is needed to evaluate the economics, safety, and general feasibility. All of the costs involved in building the proposed prototype program would be incurred for research and development. No worthwhile power generation is expected.

3. High Temperature Gas-cooled Reator (HTGR) — The HTGR is between the water reactors and the IFR in maturity. Although a 330-MWe plant was built in Colorado over 10 years ago, and development has continued since that time, the current need is for a standardized design that would serve as the model for a number of later plants. An intermediate step may be desirable which would provide added knowledge and experience from which a standard design might then be produced. One may expect that substantial costs for research and development and prototype construction will be incurred.

4. Fuel Cycle Project — A considerable amount of work has been done on the back end of the fuel cycle. However, the knowledge obtained needs to be integrated and applied to specific reactor projects (much as has been conceived for the IFR). Any system constructed would be capable of commercial use, and although being the first-of-a-kind would entail costs beyond normal, the residual value would be substantial.

It is difficult to estimate what a program of this magnitude would cost at this time, for much depends upon how the project is organized, the size of plants, electricity produced, where construction would take place, etc. One can, however, summarize typical amounts often associated with such projects. Representative figures might be as shown in Table 2.

For the above program to be built within a reasonable cost framework assumes a fresh start, that government will not turn the program into a "pork barrel," and that industry will not turn the program into a "boondoggle." It further assumes no unreasonable delays due to judicial or political activity. In essence, it is assumes project execution much as at the start of the First Era, that is, in the 1950s and early 1960s. The probable shortfall of even several billion dollars is not unreasonable if spread over ten years.

Some possible ways of keeping the costs manageable include the following:

1. Utilize an existing federal site with reasonable construction costs and one which does not have a history of politically motivated delays;

2. provide federal government land, infrastructure, and support services without cost to investors;

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Table 2

COSTS OF PROPOSED PROTOTYPE REACTOR PROGRAM

	Cost ($billions)	Power Value*
Two 600-MWe Light-Water Reactor Plants	2.5	1.8
HTGR	0.5	0
Integral Fast Reactor	0.5	0
Fuel Cycle Project	1.5	0.5
Total Cost	5.0	
Total Power Value	2.3	
Shortfall of cost less power value	2.7	

*"Power Value" assumes value only for final electricity production and does not include value for research and development.

3. obtain support from domestic and overseas contributors in return for rights concerning technology, experience, training, etc;

4. provide government financial support similar to that used in the late 1950's and early 1960s;

5. provide oil-saving tax credits similar to those available for ethanol. A large nuclear plant saves 10 million barrels of oil per year. The cost in foreign exchange for two large oil fired stations is 300 to 400 million dollars per year. (Imported uranium, by comparison, would cost about 16 million dollars per year, or about one-twentieth of the cost of oil.) A tax break comparable to that available for ethanol would make light-water reactor plants highly profitable.

Ownership and Financing

The maximum practical amount of private financing and private ownership would be desirable for the proposed program. This would be mainly in the light-water reactor and HTGR categories, but means might be found to extend such ownership to other categories.

The light-water reactors would be built and operated with the intention of becoming permanent commercial generating stations. They could be privately-owned by generating companies. Power from two medium-sized nuclear plants would exceed that of many small utilities. The plants' value would be several hundred million dollars per year. In the event private investment is not forthcoming, the strategic need for the program would justify the government proceeding alone even though that is not the most desirable course.

Summary of the Results to be Achieved

Completion of the proposed program would produce the following results:

1. Two fully licensed, standardized, advanced designs as a basis for larger scale use when required;

2. operation of a major commercial power generating center with a capacity of 1,000 to 2,000 MWe;

3. the advantages and disadvantages of the HTGR would be better established;

4. the Integral Fast Reactor concept, technology, and potential would provide concrete results for evaluation, and a basis for the next step;

5. public obstacles associated with the nuclear power waste system would be alleviated;

6. a pattern would exist for the subsequent construction, evaluation, and licensing of advanced designs;

7. a national center would exist specifically for leading the way in the advancement of commercial nuclear power;

8. the USA would hold a position in commercial nuclear power comparable to other leading nations.

Conclusion

The chaos of the latter part of the first nuclear power era, now nearing an end, was not inevitable. Nor is a phase-out of nuclear power in the USA early in the next century inevitable, as trends would indicate. The interplay of many forces will not allow the industry to disappear.

But correcting past mistakes and preparing for future requirements will not result from maintaining a status quo. Without action, the next nuclear era will always be 10 to 15 years into the future, until the pressure of events forces society to choose only the most expedient options. Should that happen, the cost of our lack of preparation would be enormous. Repeating in the Second Era even some of the mistakes of the First Era is unthinkable. Although launching a Second Era presents many challenges, they are small

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compared to those to be expected if the future is left to chance. And if the Second Era looks difficult, consider the problems of future generations attempting a Third Era if the Second is mismanaged as badly as the First.

The case for advance preparation appears overwhelming. Time is available, the cost is affordable, and public support can be obtained. A bold program, such as this one admittedly is, will no doubt be criticized by some as lacking feasibility, too large, etc. But twenty years ago such a program would have appeared modest. Thinking small may be easier, but it will not solve a large problem. Creeping along, nibbling at big challenges, will not produce results in proportion to need. Moreover, the USA functions best in bold undertakings and in the long run those have the greatest chance of success. Patience is soon lost in long-term activities which have little appeal to the imagination.

A new administration will take over in 1989. The "energy problem" will surface again sooner or later, perhaps as it did only a few years back, and a strategy for coping with it will have to be considered at some point. An old political maxim says that "If all else fails, do the right thing." That just might happen to nuclear power with a little nudging in the right places.

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SOUTH AFRICA

First quarter 1988 output from Chamber of Mines producers totaled 2,499,000 pounds U_3O_8, a 1.3 percent increase from the fourth quarter of 1987. Minor production increases by Driefontein Consolidated, ERGO, Chemwes, Vaal Reefs and Western Areas were almost offset by minor decreases in production at Bufflesfontein, Freegold, Harmony, Hartebeestfontein and Randfontein. These production figures are more in line with the production levels that existed prior to last year's strike difficulties with the National Union of Mineworkers.

Total production for South Africa in 1988 is expected to increase slightly from the 1987 level of 10.3 million pounds U_3O_8, because the miners strike was resolved.

Table 3
REPUBLIC OF SOUTH AFRICA
RECENT URANIUM PRODUCTION[1]
(Thousands of Pounds U_3O_8)

Operation	Second Quarter 1987	Third Quarter 1987	Fourth Quarter 1987	First Quarter 1988	Percent Change[2]
Buffelsfontein	245	240	229	214	- 6.7
Driefontein Consolidated	41	42	36	40	+12.2
ERGO[3]	79	85	93	104	+12.2
Freegold[4]	245	223	277	257	-7.4
Harmony	103	97	90	88	-1.2
Hartebeestfontein	231	223	219	212	-3.2
Randfontein	297	148	259	249	-4.1
Stilfontein (Chemwes)	234	232	239	255	+6.7
Vaal Reefs	977	768	927	977	+5.4
Western Areas	104	124	98	102	+4.3
TOTAL[5]	2,555	2,184	2,467	2,499	+1.3

[1]Excludes Palabora Mining Company, which is not a member of the Chamber of Mines.

[2]Change in percent from the fourth quarter of 1987.

[3]ERGO = East Rand Gold and Uranium Company Ltd.

[4]Formerly Free State Joint Metallurgical Scheme.

[5]Columns may not add up due to rounding.

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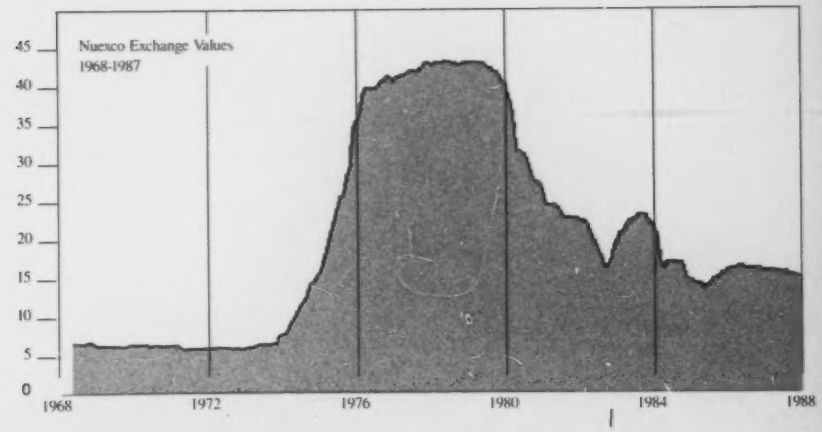

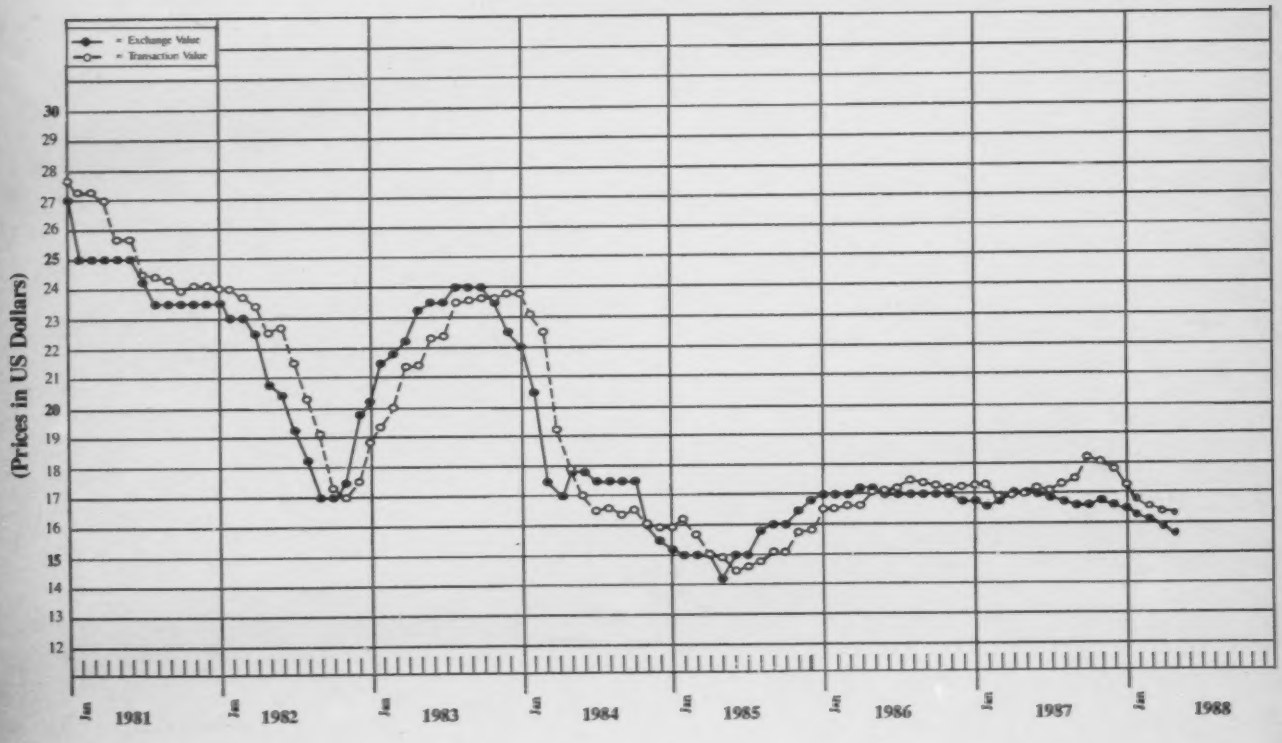

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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated ($US/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	16.75	16.65	16.55
1988	16.30	16.15	15.90	**15.75**								

HISTORICAL US PREMIUM (Relative to the Exchange Value)

Determined as of the last day of the month indicated ($US/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	0.65	0.75
1987	0.85	1.00	1.50	1.50	0.90	0.60	2.50	2.35	2.10	1.65	0.85	0.65
1988	0.70	0.50	0.15	**.25**								

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated ($US/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.30	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.05	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	18.05	17.80	17.20
1988	16.85	16.65	16.55	**16.45**								

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated ($US/lb. U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1988	1.90	1.80	1.80	**1.80**								

HISTORICAL UF_6 VALUES

Determined as of the last day of the month indicated ($US/kg. U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	47.00	47.00	47.00
1988	46.50	46.00	45.50	**45.25**								

HISTORICAL US UF_6 PREMIUM (Relative to the UF_6 Value)

Determined as of the last day of the month indicated ($US/kg U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	2.50	2.50
1987	2.50	2.50	3.50	3.00	2.25	1.75	6.50	6.00	4.25	3.10	2.25	2.00
1988	1.25	1.25	0.50	**0.50**								

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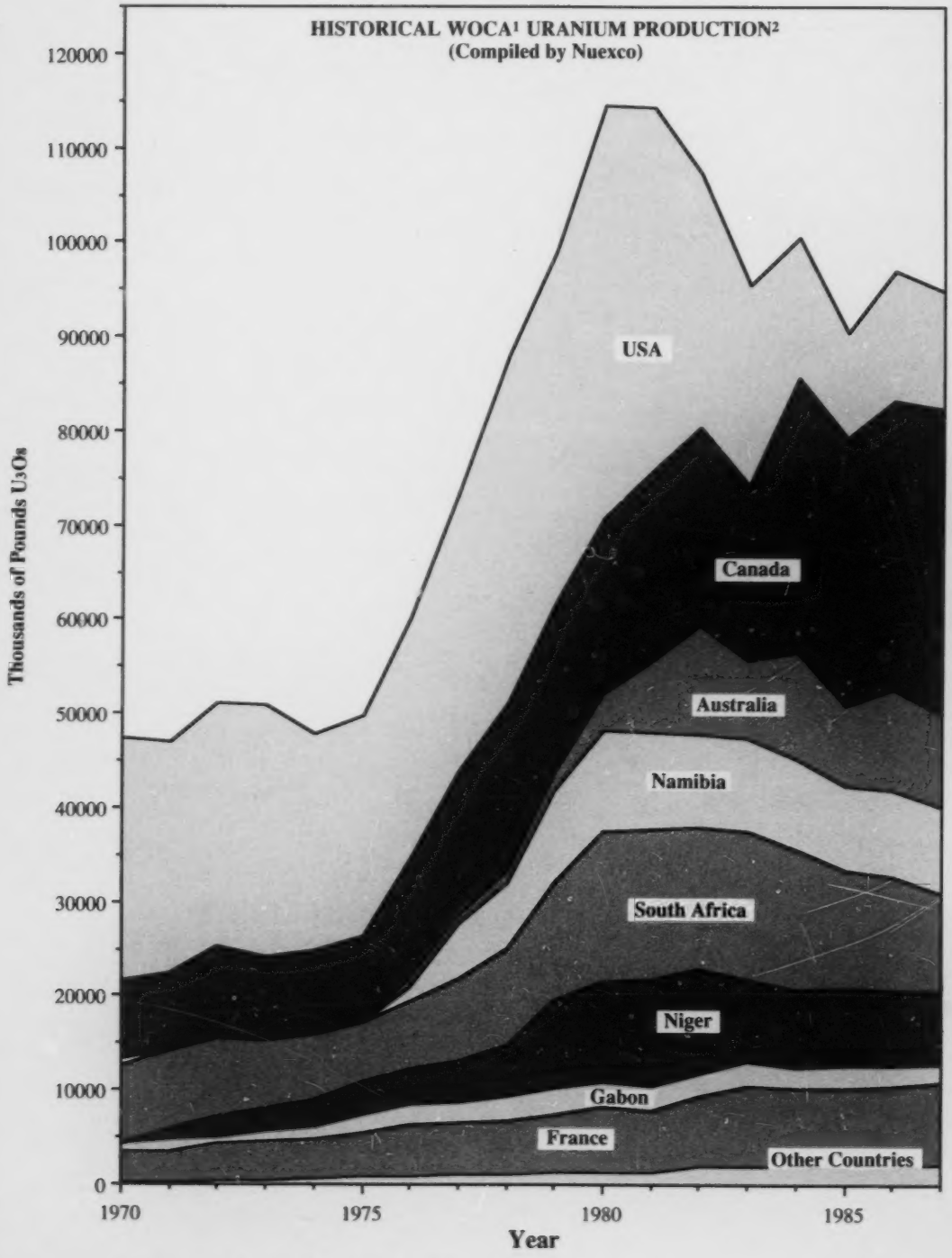
HISTORICAL MARKET DATA



[1]WOCA = World Outside of Centrally-Planned Economic Areas.
[2]1987 production data are preliminary.

US URANIUM MARKETING ACTIVITIES STATISTICS[1]
(Compiled from data published by the US Energy Information Administration)

Year	Total Production[2] (million pounds U_3O_8)	Deliveries to Domestic Utilities[3] (million pounds U_3O_8)	Average Price of Delivered Uranium ($/lb. U_3O_8)	Quantity of Uranium Imported[4] (million pounds U_3O_8)	Average Price of Imported Uranium ($/lb. U_3O_8)	Quantity of Uranium Exported (million pounds U_3O_8)
1976	25.5	n/a	n/a	3.6	n/a	1.2
1977	29.9	n/a	n/a	5.6	n/a	4.0
1978	37.0	n/a	n/a	5.2	n/a	6.8
1979	37.5	33.0[5]	$23.85[5]	3.0	n/a	6.2
1980	43.7	35.0[5]	$28.15[5]	3.6	$43.10	5.8
1981	38.5	32.6[5]	$34.65[5]	6.6	$32.90	4.4
1982	26.9	27.1	$38.37	17.1	$27.23[6]	6.2
1983	21.2	24.2	$38.21	8.2	$26.16	3.3
1984	14.9	22.5	$32.65	12.5	$21.86	2.2
1985	11.3	21.7	$31.43	11.7	$20.08	5.3
1986	13.5	18.9	$30.01	13.5	$20.07	1.6

[1]Sources: 1979: US Department of Energy, Assistant Secretary for Resource Applications, Office of Uranium Rresources and Enrichment, *Survey of United States Uranium Marketing Activity*, DOE/RA-0053 (Washington DC, July 1980). 1980-1981: US Department of Energy, ASsistant Secretary for Nuclear Energy, Office of Uranium Enrichment and Assessment, *Survey of United States Marketing Activity*, DOE/NE-0013 and DOE/NE-0013/1 (Washington DC, June 1981 and July 1982). 1982: Energy Information Administration, *1982 Survey of United States Marketing Activity*, DOE/EIA-0403 (Washington DC, September 1983). 1983: Energy Information Administration, *Survey of United States Marketing Activity 1983*, DOE/EIA-0403(83) (Washington DC, August 1984). 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[2]Sources: 1976-11982: US Department of Energy, Grand Junction Area Office, *Statistical Data of the Uranium Industry*, GJO-100 (Grand Junction, Colorado, January 1983). 1983: Calculated by the staff of the Nuclear and Alternate Fuels Division, Office of Coal, Nuclear, Electric and Alternate Fuels, Energy Information Administration, from US Department of Energy, Grand Junction Area Office data files. 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[3]Excludes direct imports by domestic utilities.

[4]Includes imports by domestic utilities and domestic suppliers.

[5]Includes delivery commitments to domestic utilities and agents.

[6]Computation of quantity-weighted average price excludes the quantity associated with a large exchange (swap) transaction that occurred in 1982.

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HISTORICAL MARKET DATA

VOLUME AND PRICE OF URANIUM DELIVERIES TO THE EUROPEAN COMMUNITY[1]
(Compiled from data published by the Euratom Supply Agency)

Year	Volume of Deliveries to the EC[2] (in MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts[3,4]		Spot Contracts[3,4]	
			Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8	Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8
1977	n/a	n/a	n/a	n/a	n/a	$41.00
1978	n/a	n/a	n/a	n/a	n/a	$43.00
1979	10,000	n/a	n/a	n/a	n/a	$44.50
1980	8,600	n/a	n/a	$36.00	n/a	$35.00
1981	13,000	less than 10	n/a	$33.25	n/a	$28.00
1982	12,500	less than 10	ECU 32.25	$32.00	ECU 24.25	$24.00
1983	13,500	less than 10	ECU 34.75	$31.00	ECU 26.00	$23.25
1984	11,000	less than 10	ECU 37.75	$29.75	ECU 24.50	$19.25
1985	11,000	11.5	ECU 38.00	$29.00	ECU 19.50	$15.00
1986	12,000	9.5	ECU 31.50	$31.00	ECU 18.00	$17.75

[1]The twelve European Community member nations are Belgium, Denmark, France, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.

[2]The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

[3]For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar.

[4]Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

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AUSTRALIA

		Consumer Price Index[1] (1980/1981 = 100)	Price Index of Materials Used in Manufacturing Industry — All Groups[2] (1984/1985 = 109)	Award Rates of Pay Indexes Australia - Adult Males In Mining Wage Earners, Weekly Rates[3] (June 1976=100)
1975	Avg.[4]	57.9	36.3	82.1
1976	Avg.	65.7	40.7	99.7
1977	Avg.	73.8	46.3	110.8
1978	Avg.	79.7	52.0	117.7
1979	Avg.	86.9	69.5	127.9
1980	Avg.	95.8	83.1	140.8
1981	Avg.	105.0	85.9	154.1
1982	Avg.	116.7	89.0	174.9
1983	Avg.	128.5	96.9	181.9
1984	Avg.	133.6	98.0	194.4
1985	Avg.	142.6	107.3	202.7
1986	Avg.	155.5	101.5	213.0
1987	Avg.	—	108.9	—
Jan	1987	—	106.2	215.9
Feb	1987	—	108.9	216.5
Mar	1987	164.7	108.4	222.2
Apr	1987	—	108.3	222.2
May	1987	—	108.1	222.0
June	1987	167.2	108.1	222.2R
July	1987	—	108.7	222.5R
Aug	1987	—	110.5	222.2R
Sep	1987	170.0	109.3	222.8R
Oct	1987	—	108.6	223.0
Nov	1987	—	110.0	222.6
Dec	1987	172.9	111.9	—
Jan	1988	—	112.4	—

P = Preliminary R = Revised since last month

[1]Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: Financial year July 1980 to June 1981 =100.0). Figures shown at end of quarter represent quarterly average.

[2]Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0).

[3]Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.

[4]Monthly data for the period 1967 to 1986 appear in Report 233.

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GOVERNMENT STATISTICS

CANADA

		Industrial Products Price Index: All Commodities[1] (1981 = 100)	Consumer Price Index: All Items (1981 = 100)	Wage-earner Data: Average Hourly Earnings (C$)[2] Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Metal Rolling, Casting and Extruding (SIC 298)	Chemicals and Chemical Products Industries (SIC 372-379)
1979	Avg.	80.0	80.7	—	—	—	—	—
1980	Avg.	90.7	88.9	—	—	—	—	—
1981	Avg.	100.0	100.0	—	—	—	—	—
1982	Avg.	106.7	110.8	—	—	—	—	—
1983	Avg.	110.4	117.2	17.22	—	14.18	10.67	11.10
1984	Avg.	115.4	122.3	17.89	—	14.97	11.11	11.68
1985	Avg.	118.6	127.2	18.53	16.48	15.56	11.85	12.12
1986	Avg.	119.6	132.4	19.38	16.70	15.76	12.28	12.58
Jan	1987	120.0	135.2	19.53	16.93	16.03	12.58	12.89
Feb	1987	119.8	135.8	20.33	17.20	16.21	12.66	13.11
Mar	1986	120.4	136.4	20.04	17.14	16.15	12.58	13.02
Apr	1987	121.2	137.0	20.47	17.38	16.26	11.99	13.27
May	1987	122.0	137.8	20.50	17.12	15.96	11.44	13.19
June	1987	122.5	138.2	20.23	16.94	15.70	12.77	12.88
July	1987	123.2	139.2	19.75	16.73	15.63	12.52	12.98
Aug	1987	123.8	139.3	19.64	16.98	15.87	12.65	13.03
Sep	1987	124.1	139.3	19.85	17.20	16.25	12.57	13.40
Oct	1987	124.5	139.8	20.06	17.31	16.33	13.01	13.37
Nov	1987	125.1	140.4	20.47	17.50	16.50	12.63	13.53
Dec	1987	125.5R	140.5	20.62	17.31	16.37	12.54	13.75
Jan	1988	126.2R	140.8	20.70R	17.54R	16.65R	12.82R	13.73R
Feb	1988	125.7R	141.3	20.94P	17.86P	16.96P	13.05P	13.71P
Mar	1988	125.9	142.0	—	—	—	—	—

P = Preliminary R = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Monthly data for the period 1967 to 1986 is found in Report 233.
[2]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours." Monthly data for the period 1983 to 1986 is found in Report 233.
[3]Reports 175 through 185 list this series title incorrectly as "Metal Mining, Including Milling (SIC 050-099)."

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REPUBLIC OF SOUTH AFRICA

		Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982 = 100)[2]	Consumer Price Index[3] (1985 = 100)	Production Price Index All Groups[4] (1980 = 100)	Total Employment in Mining and Quarrying[5]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand)[5]
1975	Avg.	16.71	—	29.4	52.1	639,473	1,003,217
1976	Avg.	19.30	—	32.7	59.9	671,240	1,212,983
1977	Avg.	23.87	—	36.3	67.7	712,006	1,420,670
1978	Avg.	27.14	—	40.3	74.3	658,261	1,502,975
1979	Avg.	30.18	—	45.6	85.6	686,599	1,795,638
1980	Avg.	35.53	—	51.9	100.0	709,042	2,237,689
1981	Avg.	41.89	—	59.8	113.6	722,918	2,756,928
1982	Avg.	47.25	104.2	68.6	129.4	702,041	3,181,584
1983	Avg.	51.88	115.0	77.1	143.1	700,901	3,563,282
1984	Avg.	58.95	130.3	86.0	155.1	711,511	4,134,390
1985	Avg.	68.76	151.6	100.0	181.2	724,587	4,778,612
1986	Avg.	80.22	177.9	118.6	216.6	756,637	5,767,950
1987	Avg.	—	—	137.7	246.8	—	—
Jan	1987	—	—	128.9	233.9	750,496	529,682
Feb	1987	—	—	130.3	237.0	758,230R	600,258R
Mar	1987	88.17	197.1	132.4	239.6	763,003R	536,033R
Apr	1987	—	—	134.1	242.5	765,309R	535,876R
May	1987	—	—	135.6	243.6	761,026R	531,732R
Jun	1987	90.74	203.5	136.6	244.9	763,319R	571,407R
July	1987	—	—	138.2	246.8	764,810R	624,954R
Aug	1987	—	—	140.2	249.9	761,338	564,387
Sep	1987	100.79	224.7	142.0	252.4	742,417	587,707
Oct	1987	—	—	143.6	255.5	725,599	599,116
Nov	1987	—	—	144.8	256.3R	734,630	616,725
Dec	1987	100.34	267.0	145.9	258.3	712,896	613,262
Jan	1988	—	—	147.2	261.5	—	—
Feb	1988	—	—	148.2	—	—	—
Mar	1988	—	—	150.2	—	—	—

P = Preliminary R = Revised since last month

[1]Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly. Historical Data by month appears in Report 236.

[2]Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

[3]Central Statistical Service, Pretoria: All income groups-weighted average, Historical Data by month appears in Report 236.

[4]Central Statistical Service, Pretoria: All commodities for consumption in South Africa.

[5]Central Statistical Service, Pretoria: Historical Data by month appears in Report 236.

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GOVERNMENT STATISTICS

UNITED STATES

		Producer Price Index[1]		Consumer Price Index[2]	GNP Implicit Price Deflator[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
		Industrial Commodities (1982 = 100)	All Commodities (1982 = 100)	(1982-1984 = 100)	(1982 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980	Avg.	88.0	89.8	82.4	85.7	10.26	10.63	8.30	6.94
1981	Avg.	97.4	98.0	90.9	94.0	11.55	11.98	9.12	7.62
1982	Avg.	100.0	100.0	96.5	100.0	12.31	12.93	9.96	8.21
1983	Avg.	101.1	101.3	99.6	103.9	12.58	13.43	10.58	8.67
1984	Avg.	103.3	103.7	103.9	107.7	13.05	13.43	11.07	9.04
1985	Avg.	103.7	103.2	107.6	111.2	13.38	13.74	11.56	9.46
1986	Avg.	100.0	100.2	109.6	114.1	13.20	13.49	11.98	9.65
1987	Avg.	102.6	102.8	113.6	—	—	—	—	—
Jan	1987	100.4	100.5	111.2	—	12.94	12.98	12.18	9.84
Feb	1987	100.8	101.0	111.6	—	12.99	12.83	12.21	9.84
Mar	1987	101.1	101.2	112.1	116.1	13.04	12.79	12.24	9.84
Apr	1987	101.6	101.9	112.7	—	13.16	12.90	12.30	9.82
May	1987	101.9	102.6	113.1	—	12.97	12.92	12.31	9.83
Jun	1987	102.4	103.0	113.5	117.2	13.05	12.93	12.27	9.84
Jul	1987	103.1	103.5	113.8	—	13.06	13.07	12.37	9.89
Aug	1987	103.7	103.8	114.4	—	13.03	13.07	12.34	9.90
Sep	1987	103.5	103.7	115.0	117.8	13.19	13.44	12.56	9.98
Oct	1987	104.0	104.1	115.3	—	12.96	13.06	12.52	9.95
Nov	1987	104.2	104.2	115.4	—	12.89	13.10	12.56	10.00
Dec	1987	104.1	104.1	115.4	118.7	12.78	13.14	12.62	10.05
Jan	1988	104.3	104.5	115.7	—	13.02	13.00	12.56	10.03
Feb	1988	104.4	104.6	116.0	—	13.09P	12.91P	12.54P	10.04P
Mar	1988	104.7	104.9	116.5	119.4	—	—	12.52P	10.09P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents. Historical data is presented in Report 233.

[2]US Bureau of Labor Statistics, Washington, D.C.: Consumer Price Index for All Urban Consumers, US City Average, All Items. Historical data is presented in Report 233.

[3]US Department of Commerce, Washington, D.C.: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted. Historical data is presented in Report 233.

[4]US Bureau of Labor Statistics, Washington, D.C.: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Historical data is presented in Report 233.

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